

TYPE "BC-11" HAMMER DRILL.



INGERSOLL-RAND COMPANY

Form No. 4011

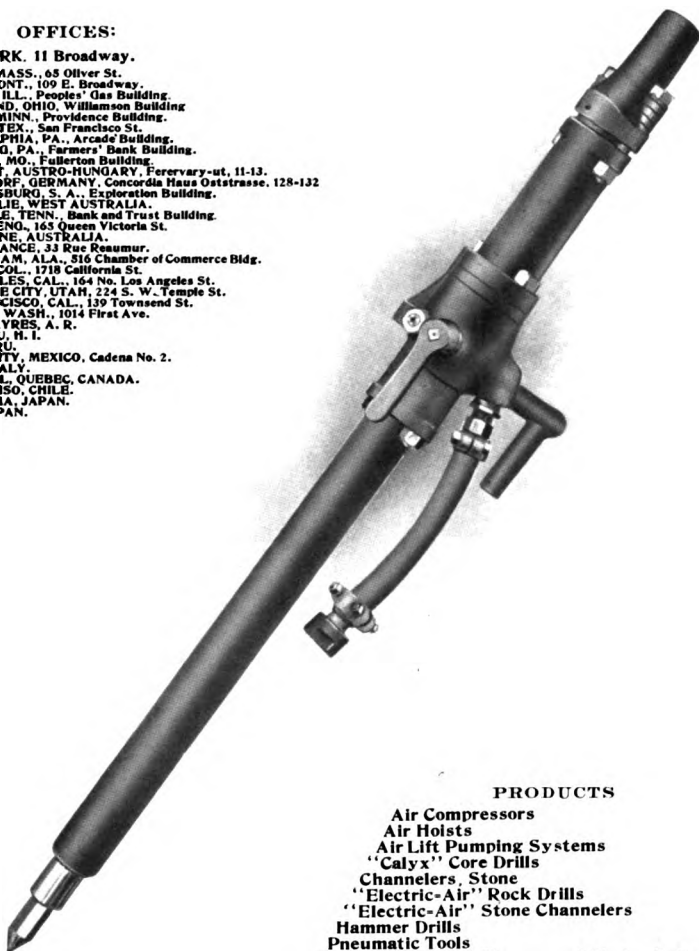
11 BROADWAY, NEW YORK

January, 1911

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PRODUCTS

Air Compressors
Air Hoists
Air Lift Pumping Systems
"Calyx" Core Drills
Channelers, Stone
"Electric-Air" Rock Drills
"Electric-Air" Stone Channelers
Hammer Drills
Pneumatic Tools
"Radialaxe" Coal Shearer and Under Cutter
Reheaters
Rock Drills
Sand Rammers, Pneumatic
Submarine Drills

TYPE "BC-11" BUTTERFLY VALVE HAMMER DRILL



Raising with "BC-11" Hammer Drill

General Description

Piston diameter	-	-	-	-	-	-	-	-	-	2"
Piston stroke	-	-	-	-	-	-	-	-	-	4"
Length of feed	-	-	-	-	-	-	-	-	-	22"
Length of machine over all (closed)	-	-	-	-	-	-	-	-	-	52½"
Length of machine over all (extended)	-	-	-	-	-	-	-	-	-	74½"
Weight	-	-	-	-	-	-	-	-	-	69 lbs.
Size air hose	-	-	-	-	-	-	-	-	-	½"
Front head broached to fit any steel specified by customer.										
One wrench fits all nuts.										

Equipment

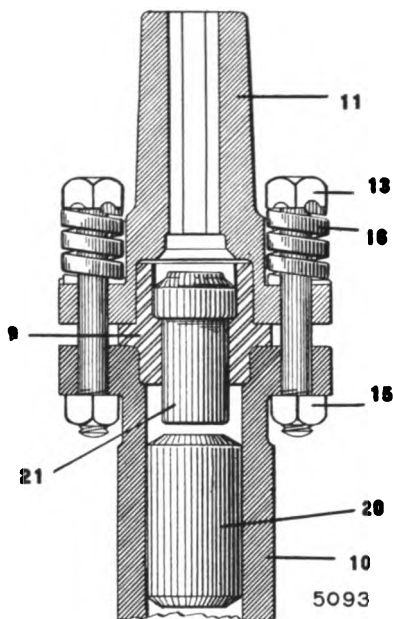
Each telescope feed hammer drill outfit is understood to include a complete drill with telescope feed, together with such fittings as may properly go with the machine in the way of valves, handles, hose connections, the necessary wrenches, etc. Hose, mounting and steels, however, are not included as a part of the regular machine outfit.

Prominent Features

The Butterfly valve hammer drill embodies a number of desirable features, prominent among which are the following:—

- Unequalled lasting qualities
- Positiveness and simplicity of valve action
- Ease of rotation
- Simplicity of construction
- Single throttle control
- Accessibility
- Automatic lubrication
- Single exhaust
- Spring retained chuck
- Renewable anvil block or tappet bearing
- Non freezing valve motion
- High efficiency
- No small ports to clog
- All wearing parts hardened and ground
- No mounting required

Front Head or Chuck Construction



Cylinder, part 10, is fitted with a bushing, part 9, which carries the anvil block, part 21. This arrangement obviates replacing the entire cylinder when the anvil block bearing becomes worn, as was necessary in former constructions. The bushing is made of a superior quality of hardened steel and is easily replaced when, after long usage, it becomes worn.

Front head, part 11, is spring retained and the parts are so designed and arranged that when the steel is out of the machine, the blows of the piston will be taken up by the front head

and its springs and not on a shoulder inside of the cylinder. Front head will be broached to fit any shape or size steel specified by customer.

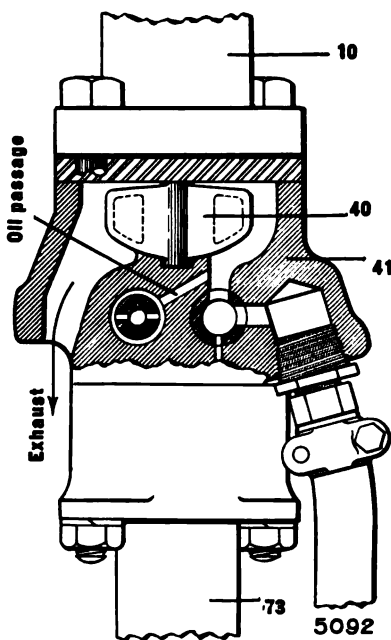
The piston, part 20, has no grooves or weak projections and both ends being the same it cannot be put in the cylinder wrong.

The material and method of treatment used in anvil block, Part 21, is the result of exhaustive tests and years of experience in making similar pieces. The block is superior to other tappets now in use.

Holes are provided in front of the tappet to permit the escape of any dirt or cuttings which enter the chuck around the drill shank.

The cushion springs are designed to lock the front head bolts thus doing away with cotter pins or lock nuts.

Valve and Chest Contruction

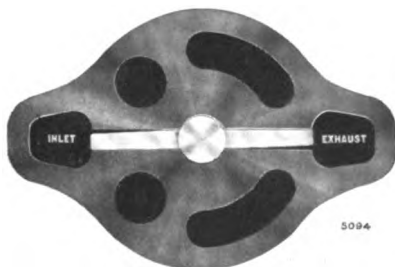


The Butterfly valve, part 40, consists of two wings and a central stem on which it oscillates. One wing controls the supply to each end of the cylinder, the other wing controlling the exhaust from the alternating ends. As the two wings are of the same area, the pressure holding the supply wing on its seat is equalled by the pressure tending to force the exhaust wing off its seat, thus making a balanced valve which requires very little pressure to shift it.

The valve closes the ports by advancing to the seat, not by sliding on the seat, thus making a better fit the longer it runs.

Valve chest, part 41, is arranged to carry the throttle valve and rotation handle. Inlet connection is so made that hose hangs close to feed cylinder.

All exhaust is at one point and directed back parallel to feed cylinder, minimizing tendency to scatter dust.

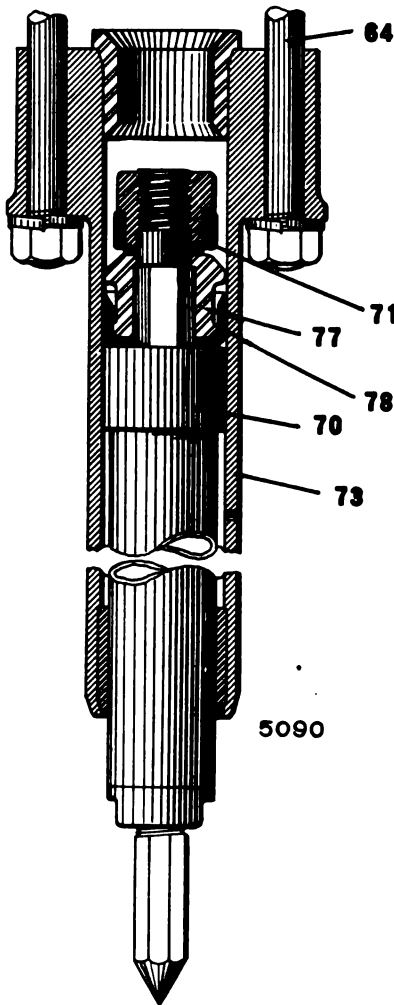


The valve is a single piece of forged steel and is indestructable

The valve chest is located between the hammer cylinder, part 10, and the air feed cylinder, part 73. All parts being held together by two bolts, no threaded joints being used.

Oil is fed from the oiler, directly to the supply side of the valve as shown.

Air Feed Construction



The air feed consists of two members, the air feed cylinder, part 73, and the feed piston, part 70. The feed cylinder is made up of a piece of special steel tubing to which a flange is permanently attached. These pieces will not be furnished separately.

The feed piston is fitted with a cup leather, part 78, which is held in place by a washer, part 77. This leather has been made deeper than in former machines and more chance is given the air to get inside of it to force it out against the walls of the cylinder.

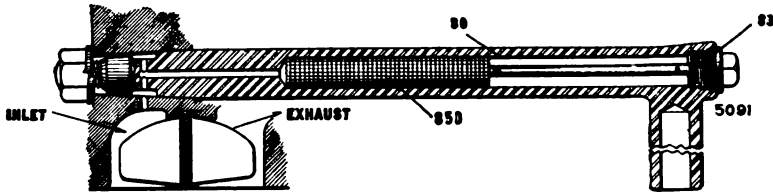
When the air piston is run in, it is automatically retained by a friction spring, part 71.

When necessary to renew the cup leather, the side bolts, part 64, are removed and the feed piston drawn out through the inner end of

the feed cylinder. There are no threaded joints on the feed cylinder or feed piston to give trouble and no clamps are needed to hold it together.

The length of feed is 22 in. and the plain type of feed only will be used. No adjustable extension will be furnished.

Rotating Handle and Oiling Device



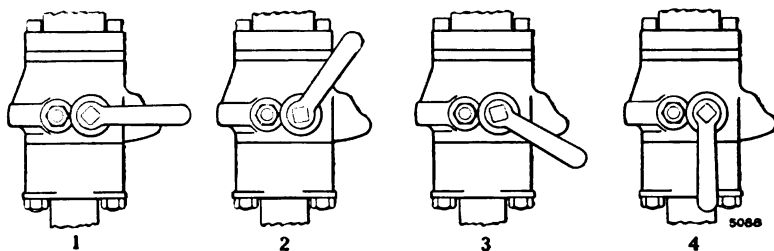
The rotating handle has a taper on one end by means of which it is attached to the valve chest. This does away with threaded connections heretofore used and which have been a great source of trouble in keeping handles tight.

An automatic oiling device is located in the rotating handle of all hammer drills of this type. This consists of a hollow handle, part 80, fitted in a taper hole in the valve chest. The bore in the handle is in direct communication with the supply side of the valve chest as shown. Located in the handle is a porous plug, part 850, beyond which is an oil chamber. Before starting the machine, oil plug, part 83, should be removed and the chamber in the handle filled with light oil. As the machine runs, the pulsations of the air in the supply chamber of the chest draws the oil through the porous plug into the machine. Means are provided to exhaust any pressure in the handle after the air is shut off without drawing all of the oil out of the chamber.

The porous plug serves a double purpose of regulating the flow of oil and cleansing it of any grit or dirt it may contain. Oil chamber in the handle should be filled before starting each shift.

Light machine oil is good to use but our special brand of Vacuum Arctic Ammonia Oil is better. Do not use thick oil as it will cause the parts to work sluggishly.

Operation of Throttle Valve



No. 1. In this position throttle valve is closed, air being shut off from the hammer and the feed.

No. 2. Position for starting a hole, giving light feed pressure and moderate drilling speed; a feature not found in any other machine. This is not the full running position.

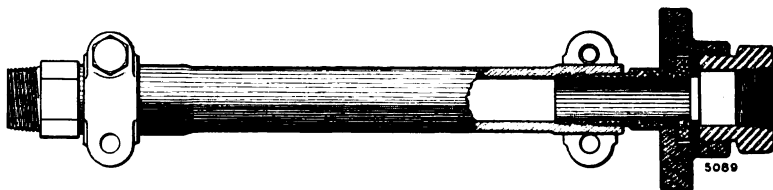
No. 3. Full pressure is on the feed, but hammer is not running. Used in "pointing" a hole.

No. 4. Full running position, maximum pressure on the feed and full drilling speed.

Inlet Connection

Each hammer drill is equipped with an inlet connection as shown in the sketch. This consists of a short section of hose having a nipple in one end which screws into the inlet in the valve chest. The other end carries an improved H D coupling complete.

This coupling is made up of three pieces; a hose stem, a nut, and a spud which is tapped for a standard pipe connection.



The parts are secured in the hose by drop forged clamps.

This form of connection has been found to give much better satisfaction than those previously used as it makes coupling up easy and quick, overcoming twisting of the hose.

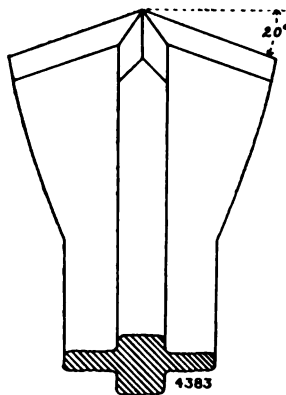
Air Supply Hose

Name	WEIGHT, LBS.		Telegraph Name	List Price	Price Per Foot
	Unboxed	Boxed			
50-foot Length PLAIN $\frac{1}{2}$ -inch 7-ply "Anti-peel" Hose, with Couplings	17	37	VOLEMIOIRA	\$11.75	\$0.20
50-foot Length WIRE-WOUND $\frac{1}{2}$ -inch 7-ply "Anti-peel" Hose, with Couplings	26	46	VOLEMIORES	12.75	0.22
50-foot Length PLAIN $\frac{3}{4}$ -inch 7-ply "Anti-peel" Hose, with couplings	29	50	VOLEMIOSE	14.00	0.24
50-foot Length WIRE-WOUND $\frac{3}{4}$ -inch 7-ply "Anti-peel" Hose, with Couplings	39	60	VOLEMIOSEA	15.00	0.26

Size and Style of Bit

Experience has demonstrated that in hammer drill work a bit with a high center gives the best result; and the steels listed on page 10 are furnished with the bit "crowned" as indicated in the sketch.

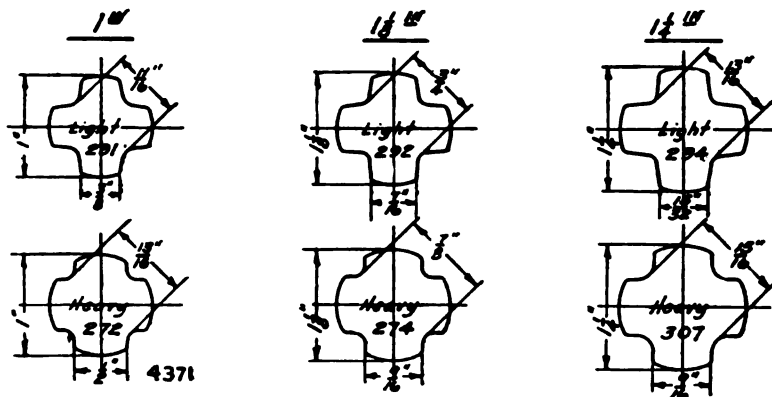
The Company recommends the use of large bits and heavy steels, as giving more satisfactory drilling results and better breaking of the ground. A hole bottomed to take 1 $\frac{1}{4}$ -inch powder will evidently break more rock than one bottomed for 1-inch powder. Probably five or six holes bottomed for the larger powder will break as much ore as eight or nine holes bottomed for only 1-inch powder. This means less proportionate drilling time for a given amount of breaking, with greater headway made, less steels to sharpen and transport. Rotation is also made easier where a large bit is used.



A "crowned" hammer drill steel bit

This general statement, while true so far as large stopes and large raises are concerned, must be qualified where narrow veins are to be followed or where the ground is such that heavy charges would pulverize the ore or shatter the walls. In the latter case smaller holes will serve and a smaller steel and bit may be used.

Steel Sections



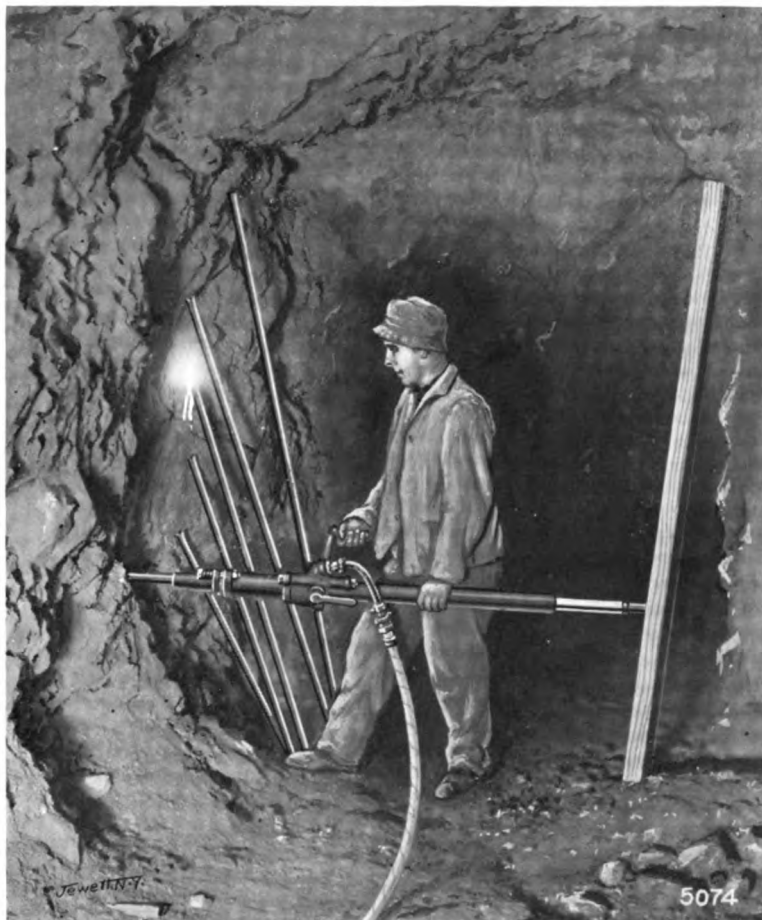
The cut shows standard sections of cruciform steel. Squares or hexagons can also be furnished. The size to be used should be specified when ordering drills. Front heads will be made for any section of steel. When special sections are wanted a sample of the steel should be submitted with order. The Butterfly Hammer Drill does not require shanking of the steel.

HEAVY CRUCIFORM HAMMER DRILL STEELS

All the Steels here listed are SOLID Steels, with FOUR-POINT CROSS Bits

Drilling Length, Exclusive of Length of Chuck, Inches	Diameter of Bit, Inches	List Price		Telegraph Name of Set	Diameter of Bit, Inches	List Price	Telegraph Name of Set	Diameter of Bit, Inches	List Price		Telegraph Name of Set	
		Per Single Steel	Per Set						Per Single Steel	Per Set		
Stand'rd Run	Heavy 1-in.—Section 272				Heavy 1 1/8-in.—Section 274				Heavy 1 1/4-in.—Section 307			
12	1 1/16	\$1.00		Volemillez	1 15/16	\$1.15	Voleminelo	2 1/16	\$1.25		Volemionar	
24	1 1/16	1.20	\$2.20	Volemillis	1 15/16	1.45	\$2.60	Voleminer	1 15/16	1.60	\$2.95	Volemionda
36	1 7/16	1.40	3.60	Volemillum	1 11/16	1.75	4.35	Volemineta	1 13/16	1.90	4.75	Volemionem
48	1 5/8	1.60	5.20	Volemilogo	1 3/4	2.00	6.35	Volemingai	1 11/16	2.20	6.95	Volemionne
60	1 3/4	1.80	7.00	Volemilos	1 7/8	2.20	6.55	Volemingo	1 9/16	2.50	9.45	Volemions
72	1 1/2	2.00	9.00	Volemilyba	1 5/8	2.40	10.95	Volemingue	1 7/8	2.90	12.25	Volemiopea

Sets having 6-inch run furnished when required.



Drifting with "BC-11" Hammer Drill

For this work different methods may be used for removing the cuttings from the hole:—

FIRST: By means of air from the machine through hollow tappet or steel.

SECOND: By means of an air or water jet fed into the hole through a $\frac{1}{8}$ inch iron pipe. Solid steel being used.

[illegible]

INGERSOLL-RAND CO.

Unsub

4-10

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